

Music Theory for Computer Musicians

Answers to the Exercises

Chapter One: Musical Sound – Exercises

Exercise 1:

Fill in the missing words: Musical tone has three basic properties. These are **pitch, intensity and tone color/timbre/tone quality.**

Exercise 2:

Fill in the missing words: The frequency of sound is measured in terms of **Hertz**. When abbreviated this term appears as **Hz**.

Exercise 3: (2 marks)

If the frequency of the first harmonic is given as 220Hz, what are the frequencies of the following harmonics?

2 nd harmonic	frequency 440Hz
5 th harmonic	frequency 1100Hz

Exercise 4:

Fill in the missing words.

Oscillators generate two main properties. These are **harmonic content** and **frequency**.

Exercise 5:

Name three examples of different timbres? **Answers here will vary and may include any types of instrumental sound i.e. flute, strings, piano, etc.**

Exercise 6:

Fill in the missing words in this paragraph.

The characteristic **timbre** of a sound is determined by its harmonic content. The harmonic content of a sound largely determines the **waveform**. The simplest of all waveforms is the sine wave. There are three other important simple waveforms - the sawtooth, the **triangle** and the **square** waveforms.

Exercise 7:

Match these six to form three related pairs: **1 and 2, 6 and 5, 3 and 4**

Exercise 8:

Circle the correct answer:

The master tune standard for Western electronic instruments is:

256Hz 332Hz 192Hz **440Hz** 19, 368Hz

Exercise 9:

Fill in the missing word: How is the volume of sound measured? The volume of sound is measured in **decibels**.

Exercise 10:

Fill in the missing words: The intensity of each note within a particular sequencer track or channel is also known as the **velocity**. This is measured on a scale from **0 to 127**.

Exercise 11:

128Hz, 192Hz, 256Hz.

Exercise 12:

Fill in the missing words: The first partial is also known as the **fundamental** frequency. If subsequent partials are related by whole numbers to the **fundamental** frequency the series is called **harmonic**

Exercise 13:

Fill in the missing words: A sound vibration of increasing amplitude manifests to the **ear** as an **increase of volume**.

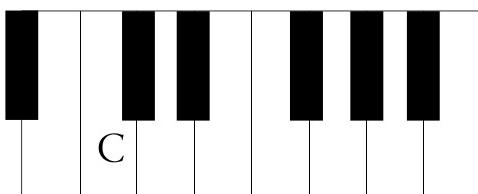
Exercise 14:

Fill in the missing words: The sound envelope is the characteristic way in which a sound develops through time. It has four components which are the **attack, decay, sustain and release**.

Chapter Two: The Notes

Exercise 1:

Draw in where the black keys should be on this keyboard. The position of note C has been given for you:



Exercise 2:

Underline the correct answer:

Note C is always:

- a) The white key to the left of the three black keys.
 - b) The white key to the right of the three black keys.
 - c) The white key to the left of the two black keys.
 - d) The white key to the right of the two black keys.

Exercise 3:

Fill in the missing words:

From note C it is necessary to count up or down **8** notes to reach note C again. The distance between any two adjacent C's on the keyboard is called an **octave**.

Exercise 4:

Fill in the missing words:

The ratio between two notes an octave apart is **2/1**. If the frequency of the first note is given as 336Hz the frequency of the note an octave above will be **672Hz**.

Exercise 5:

Place the seven letters of the musical alphabet in the boxes provided in order from the lowest to the highest:

A	B	C	D	E	F	G
---	---	---	---	---	---	---

Exercise 6:

Fill in the names of all of the white keys on this keyboard:



Exercise 7:

Fill in the missing words:

The first black key to the right of note D is called **D sharp** whilst the first black key to the left of note E is called **E flat**. As these are the same key but spelled differently they are classed as being **enharmonic** equivalents.

Exercise 8:

Answer the following questions:

- a) What does the symbol '#' mean?

Raise the pitch of a note by a semitone.

- b) What does the symbol 'b' mean?

Lower the pitch of a note by a semitone.

- c) Name five black keys which use the symbol '#':

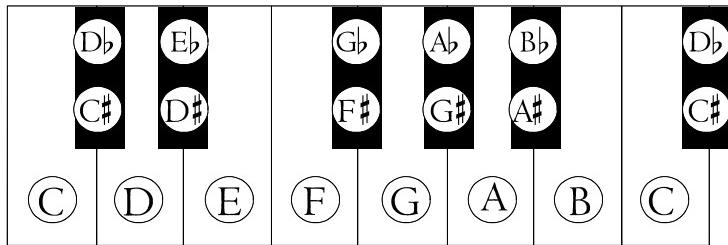
C sharp, D sharp, F sharp, G sharp and A sharp.

- d) Name five black keys which use the symbol 'b':

D flat, E flat, G flat, A flat and B flat.

Exercise 9:

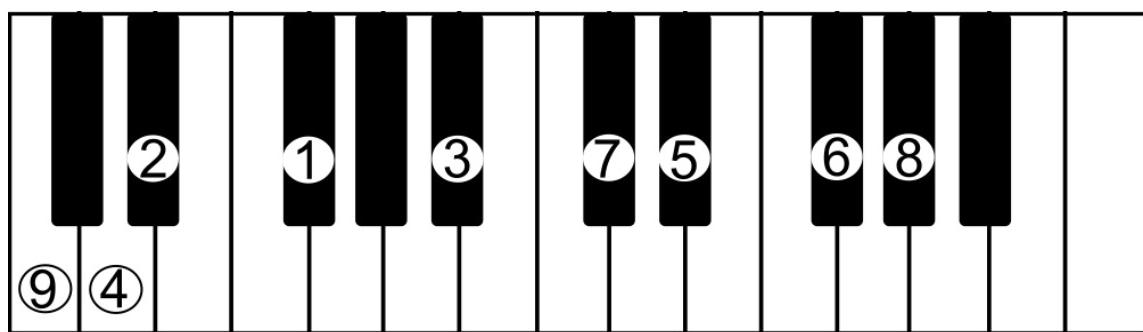
Label all of the notes correctly in the circles provided on this keyboard. Remember to give each black key two names:



Exercise 10:

Identify the key on the keyboard to which the following samples have been assigned.
The first key has already been labeled for you:

1	note F#3	closed high hat
2	note D#3	clap
3	note A#3	open high hat
4	note D3	snare
5	note D#4	ride cymbal
6	note F#4	tambourine
7	note C#4	crash cymbal
8	note G#4	vocal hit
9	note C3	kick drum



Chapter Three: The Major Scale – Exercises

Exercise 1:

Fill in the missing words: The C **major** scale has **seven** notes per octave. Their names are **CDEFGAB**

Exercise 2:

List three kinds of scales used in music:

The answers to this could vary and might include: **major, minor, chromatic, pentatonic, blues, harmonic minor, melodic minor, whole tone, octatonic, diatonic.**

Exercise 3:

Fill in the missing words: A scale that takes note **C** as the tonic note is said to be in the **key of C**.

Exercise 4:

Which degree of the scale are these notes in C major?

D

B

G

F

II

VII

V

IV

Exercise 5:

The interval between any two adjacent notes on the keyboard or **frets** on the guitar is called a **semitone**. The octave is composed of **twelve** such semitones. These are called the twelve tone **chromatic** scale.

Exercise 6:

The pattern of tones and semitones which make up the major scale is **TTSTTTS**

Exercise 7:

Define the gaps between the following pairs of notes in terms of the number of semitones:

- a) C D **2**
c) A B **2**

- b) B C **1**
d) E F **1**

Exercise 8:

Fill in the missing words: The most important note in the C major scale is the **first** scale degree which is also called the **tonic**. This note serves as the **tonal** centre for music written in that key.

Exercise 9:

Playing the C major scale. Practise this exercise on the MIDI keyboard until it is fluent:

The diagram illustrates the C major scale on a piano keyboard and its corresponding musical notation. At the top, a small section of a piano keyboard is shown with black keys and white keys. Below this, a horizontal line with arrows at both ends spans across five white keys, labeled with Roman numerals: I, 2, 3, I, 2, 3, 4, 5. Below this line is a musical staff in G clef. The staff consists of eight measures of music. The first measure starts with a quarter note (I). The second measure starts with a quarter note (2). The third measure starts with a quarter note (3). The fourth measure starts with a quarter note (I). The fifth measure starts with a quarter note (2). The sixth measure starts with a quarter note (3). The seventh measure starts with a quarter note (4). The eighth measure starts with a quarter note (5). Above the eighth measure, there is a bracket with arrows at both ends, spanning from the beginning of the first measure to the end of the eighth measure, with the word "Repeat" written above it. The notes are connected by vertical stems pointing downwards.

Chapter Four: Rhythm, Tempo and Note Lengths - Exercises

Exercise 1:

Fill in the missing word: Every sound used in a musical composition has a certain length or **duration**.

Exercise 2:

Complete the following sentence: The speed of music is called the **tempo** which is measured and described in terms of **beats per minute (BPM)**.

Exercise 3:

Name the following symbols (according to the American fractional Method):

	=	$\frac{1}{2}$ note		=	$\frac{1}{8}$ th note
	=	$\frac{1}{16}$ th note		=	$\frac{1}{4}$ note
	=	Whole note		=	$\frac{1}{32}$ nd note

Exercise 4:

Name the note value which represents the sum of the following. One example has already been done for you:

a)  = A whole note

b)  = A whole note

c)  = A dotted half note

d)  = Quarter note

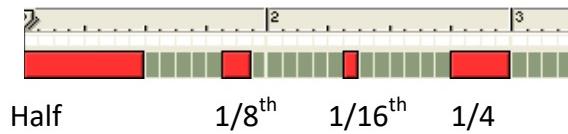
e)  = Quarter note

f)  = A whole note

g)  = An eighth note

Exercise 5:

Identify the durations in fractions of a whole note sequenced on this drum channel:



Exercise 6:

Circle the note symbol indicating the resolution required for quantization to the nearest:

a) 1/16th note:



a) 1/2 note:



a) 1/8th note:



a) 1/4 note:



Exercise 7:

Complete the following sentences:

- a) There are **8** sixteenth notes in a half note.
- b) Three quarter notes are equivalent to **6** eighth notes.
- c) There are **4 1/32nd** notes in an eighth note.

Exercise 8:

Place next to the following rests the equivalent note length:

$$\begin{array}{ccc}
 \text{♩} & = & \text{♪} \\
 \text{♩} & = & \text{♪}
 \end{array}
 \quad
 \begin{array}{ccc}
 \text{♪} & = & \text{♩} \\
 \text{♪} & = & \text{♩}
 \end{array}$$

Exercise 9:

Complete the following statements:

- a) A dotted quarter note is equivalent to **three** eighth notes.
- b) A dotted whole note is equivalent to **six** quarter notes.
- c) A dotted sixteenth note is equivalent to **three** thirty-second notes.

Exercise 10:

Place the note symbol required in the requisite space:

$$\text{B} + \text{B} + \text{B} = \text{F}^{\cdot}$$

$$\text{D} + \text{D} + \text{D} = \text{G}^{\cdot}$$

$$\text{A} + \text{A} + \text{A} = \text{C}$$

Exercise 11:

Underneath the following notes and gaps place the equivalent note value or rest required. The note resolution of the matrix grid is set to 1/16th:

The musical staff consists of five lines and four spaces. To its left is a piano keyboard graphic with black keys and white keys labeled C4 and C3. Below the staff are ten musical symbols: a note, a rest, a note, a rest, a note, a note, a rest, a note, a rest, and a note. Each symbol corresponds to a specific cell in the grid.

Chapter Five: Score Editing – Exercises

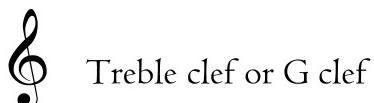
Exercise 1:

Fill in the missing words:

The **staff** is a series of five lines upon which musical notes may be placed. Notes may be placed both **on** and **between** the lines of the staff.

Exercise 2:

Write down both of the names by which the following clefs are known:



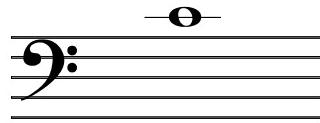
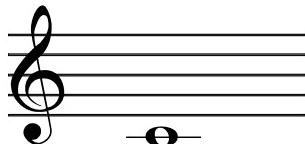
Treble clef or G clef



Bass clef or F clef

Exercise 3:

Place note ‘Middle C’ as a whole note in its correct position on the following staves:



Exercise 4:

- a) Sharp
- b) Flat
- c) The note is to be raised by a semitone.
- d) The note is to be lowered by a semitone.

Exercise 5:

Write on each staff the pitch indicated using quarter notes:

A treble clef staff with five quarter notes. The notes are positioned at the following approximate positions from left to right: C3 (4th line), G#3 (3rd space), B3 (4th line), Eb4 (3rd space), A#4 (4th line), Db3 (3rd space), A3 (4th line), C#4 (3rd space), and D4 (4th line). The staff has a key signature of one sharp.

C3 G#3 B3 Eb4 A#4 Db3 A3 C#4 D4

A treble clef staff with five quarter notes. The notes are positioned at the following approximate positions from left to right: G3 (4th line), D#4 (3rd space), F#4 (4th line), Bb3 (3rd space), F4 (4th line), Ab3 (3rd space), E4 (4th line), G#4 (3rd space), and Eb4 (4th line). The staff has a key signature of one sharp.

G3 D#4 F#4 Bb3 F4 Ab3 E4 G#4 Eb4

A bass clef staff with five quarter notes. The notes are positioned at the following approximate positions from left to right: C3 (2nd line), D#2 (1st space), B2 (2nd line), Ab1 (1st space), F#2 (2nd line), E2 (1st space), Bb1 (1st space), and F#1 (2nd line). The staff has a key signature of one sharp.

C3 D#2 B2 Ab1 F#2 E2 Bb1 F#1

A bass clef staff with five quarter notes. The notes are positioned at the following approximate positions from left to right: G2 (2nd line), A#1 (1st space), Eb2 (2nd line), Db1 (1st space), B1 (2nd line), D2 (1st space), F2 (2nd line), and F#2 (1st space). The staff has a key signature of one sharp.

G2 A#1 Eb2 Db1 B1 D2 F2 F#2

Exercise 6:

Name each of the following notes and their respective time values:

Treble clef musical staff with seven notes. Below each note is its name and time value.

D4	F#3	G#4	C4	Db3	Eb4	G#3
I/8	¼	½	¼	I/8	Whole	I/16

Bass clef musical staff with seven notes. Below each note is its name and time value.

E2	G#2	Ab1	A2	C#2	D#2	A#1
¼	Whole	I/8	¼	I/16	½	¼

Chapter Six: Intervals – Exercises

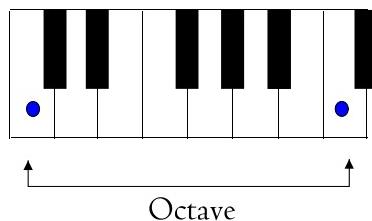
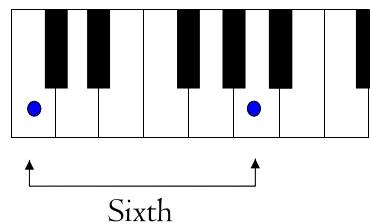
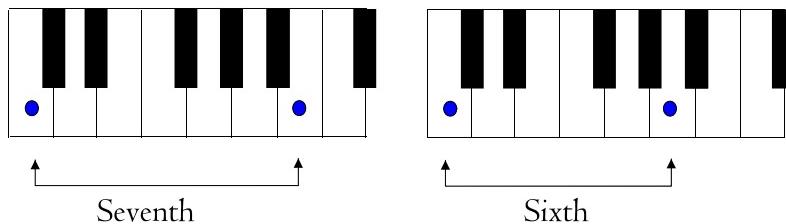
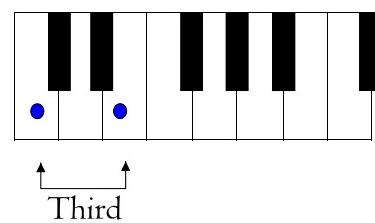
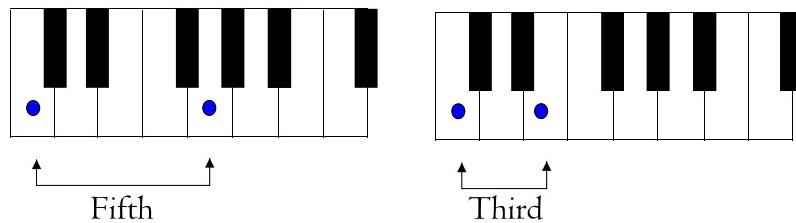
Exercise 1:

Complete the following statement:

There are two types of intervals, **simple** intervals, which are those which lie within the range of an octave, and **compound** intervals which are larger than an octave.

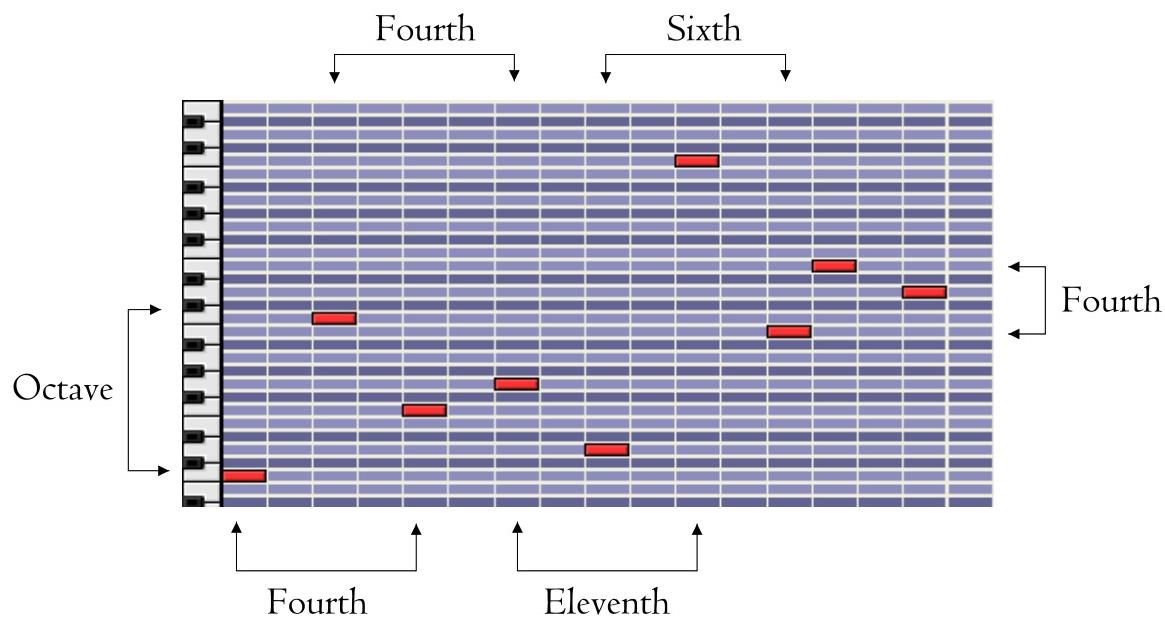
Exercise 2:

Identify the following intervals:



Exercise 3:

Name the following melodic intervals:



Exercise 4:

Fill in the missing notes:

Note C – go a seventh up – Note B – go a fifth down – Note E – go a fourth up – Note A – go a third down – Note F – go a ninth up –
Note G – go a sixth down – Note B

Exercise 5:

Complete the following list of fifths in the C major scale:

- | | | |
|----------|----------|----------|
| 1) C - G | 2) D - A | 3) E - B |
| 4) F - C | 5) G - D | 6) A - E |
| 7) B - F | | |

Exercise 6:

Complete the following sentences:

- a) A fifth above note D is note **A**
- b) A ninth above note F is note **G**
- c) A compound third above note G is note **B**
- d) A seventh below note A is note **B**
- e) A fourth below note B is note **F**
- f) A sixth above note E is note **C**
- g) An octave above note D is note **D**
- h) An eleventh above note C is note **F**

Chapter Seven: Metre - Exercises

Exercise 1:

Complete the following sentence:

Each complete metric cycle is called a **bar**. There are three basic types of metric cycle recognised in traditional musical theory. These are **duple** time, **triple** time and **quadruple or common** time.

Exercise 2:

This is a practical exercise and therefore there are no right or wrong answers.

Exercise 3:

Complete the following:

A time signature consists of **two** numbers, an upper number which is the **numerator** and a lower number which is the **denominator**. The upper number tells you **how many** beats there are in a bar whilst the lower number tells you their **value**.

Exercise 4:

What is the meaning of the following time signatures?

$\frac{2}{4}$ two quarter notes per bar

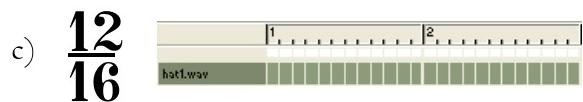
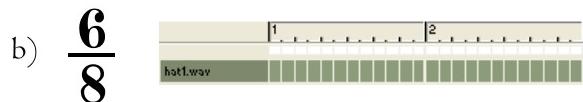
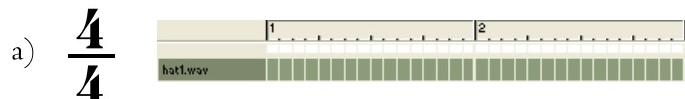
$\frac{3}{8}$ three eighth notes per bar

$\frac{9}{16}$ nine sixteenth notes per bar

$\frac{2}{4}$ two quarter notes per bar

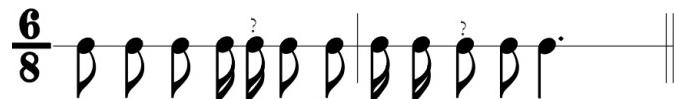
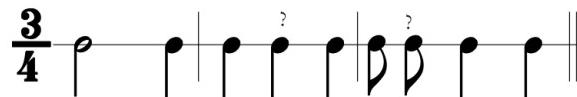
Exercise 5:

What is the correct time signature for the following drum lanes. The grid resolution is set to 1/16th:



Exercise 6:

Fill in the missing note values in order to complete the bars. A question mark has been placed where the notes are required:



Exercise 7:

Place the correct time signature at the front of each of these patterns.

The image shows four horizontal musical staves. Each staff begins with a time signature: $\frac{3}{4}$, $\frac{2}{4}$, $\frac{6}{8}$, and $\frac{4}{4}$. The first staff ($\frac{3}{4}$) has six eighth notes. The second staff ($\frac{2}{4}$) has six eighth notes. The third staff ($\frac{6}{8}$) has eight eighth notes. The fourth staff ($\frac{4}{4}$) has five eighth notes. Each staff ends with a vertical bar line and a double bar line.

Exercise 8:

List the rhythmic motives that can be devised from two sixteenths and one eighth note, each value appearing only once:



Exercise 9:

What note value are the following triplets equivalent to?:

- a) Quarter note
- b) Whole note
- c) Half note.

Exercise 10:

Below you will see the sixteen buttons of a drum machine i.e. Redrum. The resolution is set to a 1/16th. Place a tick in those boxes required to give the following rhythms for these separate drum parts:

- a) Bass drum: 1 7 11 15
- b) Open high hat: 3 7 11 15 16
- c) Snare: 5 13
- d) Closed high hat: 1 2 4 5 8 9 10 12 13 16

Chapter Eight: Chords – Exercises

Exercise 1:

Complete the following statement:

All musical intervals have a characteristic aural quality. In terms of aural quality there are two main types of intervals: **conCORDS** which includes all of those intervals which have a generally agreeable sound to the ear, and **disCORDS** which have an element of tension about them.

Exercise 2:

Complete the following statement:

There are three perfect concords which are the octave (ratio 2/1), the perfect **fifth** (ratio **3/2**) and the perfect **fourth** (ratio **4/3**).

Exercise 3:

There are four imperfect concords which are the **major third** – ratio 5/4; the minor third – ratio **6/5**; the **major sixth** – ratio 5/3; and the minor sixth – ratio **8/5**.

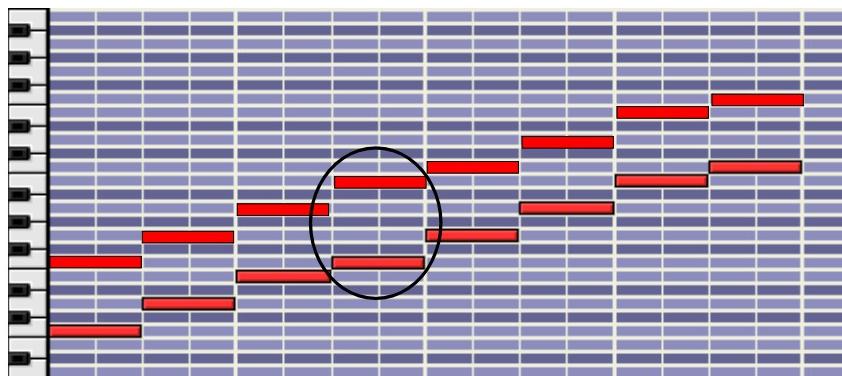
Exercise 4:

Pencil in the notes required to harmonise this melody in C major in fifths:

A blank musical staff grid consisting of 10 horizontal staves and 24 vertical measures. The staves are indicated by black vertical bar lines on the left, and the measures are defined by vertical bar lines across the grid. The grid is intended for students to write in the harmonic progression of a melody in C major using fifth chords.

Exercise 5:

Pencil in a note a fourth above each of these notes of the scale of C major. When you have done so circle the so-called ‘devils fourth’:



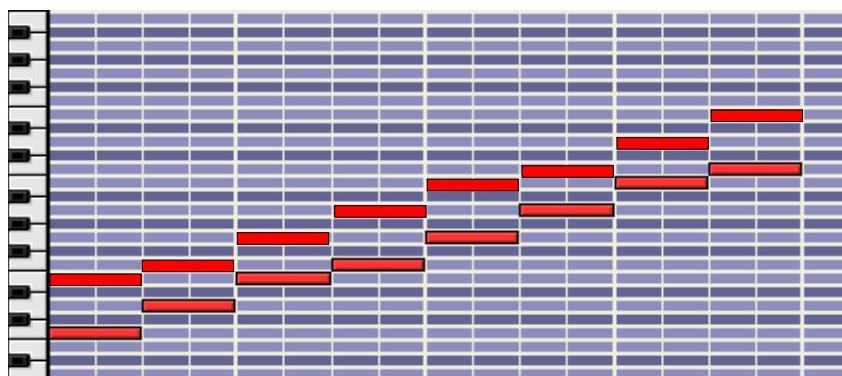
Exercise 6:

Complete the following statement:

There are two kinds of third in the major scale, there is the major third which has a width of **four** semitones, and the minor third which has a width of **three** semitones.

Exercise 7:

Pencil in the notes required for a third above each of the following notes of the scale of C major. When you have done this underline the third as being major or minor:



Maj. Min. Min. Maj. Maj. Min. Min. Maj.

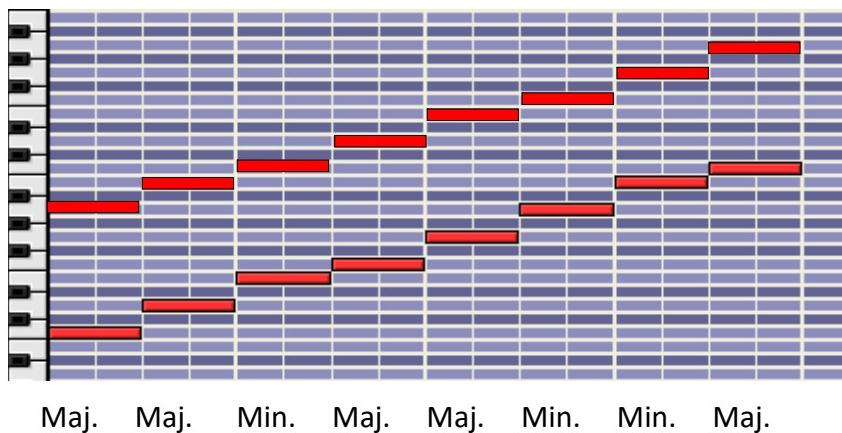
Exercise 8:

Complete the following statement:

There are two kinds of sixth in the major scale, there is the major sixth which has a width of **nine** semitones, and the minor sixth which has a width of **eight** semitones.

Exercise 9:

Pencil in the notes required for a sixth above each of the following notes of the scale of C major. When you have done this underline the third as being major or minor:



Exercise 10:

Identify the following intervals both in terms of their size and whether they are major, minor or perfect. The second note is always above the first:

<u>Notes</u>	<u>Interval</u>	<u>Notes</u>	<u>Interval</u>
C – D	Major second	F – C	Perfect fifth
G – B	Major third	C – B	Major seventh
D – F	Minor third	G – F	Minor seventh
E – F	Minor second	D – B	Major sixth
A – G	Minor seventh	A – F	Minor sixth
B – C	Minor second	E – A	Perfect fourth

Exercise 11:

List the intervals which belong in these categories:

Perfect Concord

Imperfect Concord

Discord

a) **Octave/Unison**

a) **Minor third**

a) **Minor second**

b) **Perfect fifth**

b) **Major third**

b) **Major second**

c) **Perfect fourth**

c) **Minor sixth**

c) **Minor seventh**

d) **Major sixth**

d) **Major seventh**

e) **Augmented fourth/diminished fifth**

Exercise 12:

Fill in the missing words:

The simplest sonority of all is the **interval** which results from the simultaneous combination of two notes. Combinations of three notes are called **triads**, two examples of which are the **major** triad and the **minor** triad.

Exercise 13:

Fill in the missing words:

The major triad has three notes which are called the **root**, the **third** and the **fifth**. In the case of the major triad the third is **major** whilst in the case of the minor triad the third is **minor**.

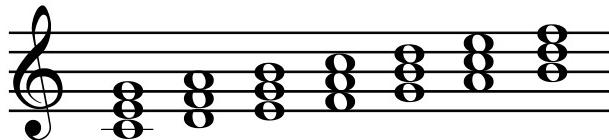
Exercise 14:

Fill in the missing notes to complete the series of triads in C major. Then identify those triads. The first chord has already been named for you:

Chord I	C	E	G	C major
Chord II	D	F	A	D minor
Chord III	E	G	B	E minor
Chord IV	F	A	C	F major
Chord V	G	B	D	G major
Chord VI	A	C	E	A minor
Chord VII	B	D	F	B diminished

Exercise 15:

Fill in the missing whole notes required to complete the following triads:



Exercise 16:

Fill in the missing words:

The progression from **dominant** triad to tonic triad is called a **perfect** cadence. The **tonic** triad is built on the first degree of the scale, whilst the **dominant** triad is built on the **fifth**. In the key of C major the three notes belonging to the tonic triad are therefore **C, E and G**, whilst the three notes belonging to the **dominant** triad are **G, B and D**.

Exercise 17:

There are numerous ways of doing this. The tonic triad needs at least three notes including C, E and G; the subdominant triad the notes F, A and C and the dominant triad notes G, B and D.

Exercise 18:

I/IV/V

I/V/IV

IV/V/I

IV/I/V

V/I/IV

V/IV/I

Chapter Nine: The Natural Minor Scale – Exercises

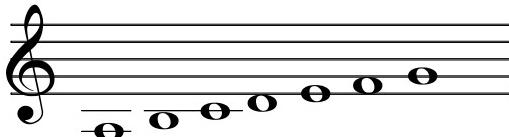
Exercise 1:

Fill in the missing words:

The relative minor key of C major is **A minor**. To find the relative minor key from a major key it is necessary to count **three** notes down.

Exercise 2:

Fill in the six missing notes required to complete a rising A natural minor scale:



Exercise 3:

Fill in the missing words:

Key concerns the note upon which a scale is built. **Mode** concerns the type of scale – major or minor.

Exercise 4:

In the space provided indicate the pattern of tones and semitones that belongs with each scale:

Major Mode: **TTSTTS**

Natural Minor Mode: **TSTTTST**

Exercise 5:

Which degree of the scale are these notes in A natural minor?:

D

B

G

F

IV

II

VII

VI

Exercise 6:

Fill in the notes required to give the three primary triads of the key of A natural minor:

Chord i: **A C E**

Chord iv: **D F A**

Chord v: **E G B**

Chapter Ten: Melody and Motives – Exercises

Exercise 1:

Fill in the missing words:

A melodic line can be thought of as having two axes: there is the axis of **pitch** – the vertical axis – and the axis of **time** – the horizontal axis.

Exercise 2:

Fill in the missing words:

Motives generally employ two or three notes played with a strong readily identifiable **rhythm**.

Exercise 3:

Answer the following questions about the given two bar melody:

a) What scale does this melodic extract use?

It uses the scale of **A natural minor**.

b) Using a pencil identify and mark out the motives used assigning to each identified motive a letter (A, B, etc.).

The musical notation consists of two staves, each in common time (indicated by '4'). The top staff starts with a quarter note (A), followed by an eighth note (B), another eighth note (C), and a sixteenth note (D). This pattern repeats for the second bar (Ai), third bar (A), and fourth bar (B). The bottom staff follows a similar pattern: a quarter note (A), followed by an eighth note (B), another eighth note (C), and a sixteenth note (D). This pattern repeats for the second bar (Ai), third bar (A), and fourth bar (B). Brackets above the top staff and below the bottom staff group these patterns into four motives labeled A, Ai, A, B respectively.

Ai = Inversion of the motive.

c) Mark out and indicate the phrase structure of the melody, giving each phrase a letter (A, B, etc.).

Phrase A – bars 1 to 2; phrase B – bars 3 to 4.

Exercise 4:

There are no right or wrong answers here.

Exercise 5:

Using the rhythm you created in exercise 4, compose a four bar lead melody based around the motive of a rising fifth, in the key of C major.

Again there are no right or wrong answers here.

Exercise 6:

Build up a four bar rhythm in quadruple time.

There are no right or wrong answers here.

Exercise 7:

Using the rhythm created in exercise 6, compose a four bar melody based around the motive of a falling third, in the key of A natural minor.

There are no right or wrong answers here.

Exercise 8:

Compose and sequence a lead for a solo flute patch.

There are no right or wrong answers here.

Chapter Eleven: the Harmonic and Melodic Minor Scales – Exercises

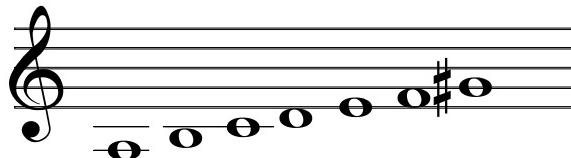
Exercise 1:

Fill in the missing words:

Although there is only one kind of major mode there are **three** types of minor mode: the natural minor, **harmonic** minor and melodic minor. The difference between the natural and harmonic minor is that the harmonic minor mode has a sharp **seventh** in order to give a leading note up to the **eighth** degree. The ascending form of the melodic minor mode also has a sharp **sixth** whilst on descent it is identical to the **natural** minor mode.

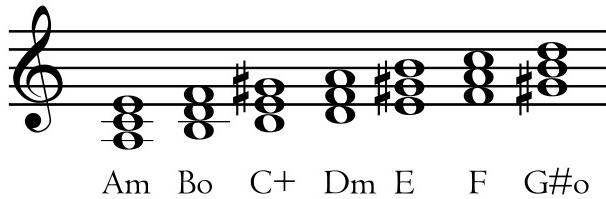
Exercise 2:

Fill in the six missing notes required to complete a rising A harmonic minor scale:



Exercise 3:

Identify the following triads from the A harmonic minor mode. The first triad has already been identified for you.



Am Bo C+ Dm E F G#o

Exercise 4:

This simply requires practice.

Exercise 5:

Sequence the given bass in A harmonic minor. Then on another track add a pad or string part over it using the chords indicated – the three primary chords of A harmonic minor.

Mark using your own discretion.

Exercise 6:

Playing the arpeggios of the chords of A harmonic minor.

This simply requires practice.

Chapter Twelve: Augmented and Diminished Intervals; Interval Inversions – Exercises

Exercise 1:

Fill in the missing words:

When an interval is **augmented** it is increased in size by a semitone. Therefore the perfect fifth – G to D – can become an augmented fifth by **sharpening** the top note D, or **flattening** the bottom note G.

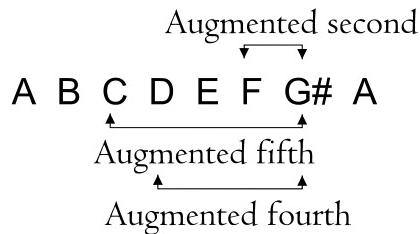
Exercise 2:

Fill in the missing words:

When an interval is diminished it is **decreased** in size by a semitone. Therefore the perfect fifth – G to D – can become a diminished fifth by **flattening** the top note D, or **sharpening** the bottom note G.

Exercise 3:

Identify the following augmented intervals in the space provided:



Exercise 4:

In the space provided identify the following augmented intervals:

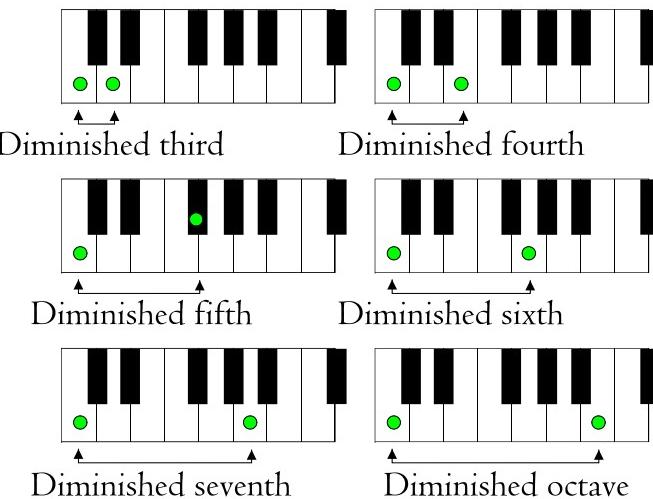
Augmented second Augmented third

Augmented fourth Augmented fifth

Augmented sixth

Exercise 5:

In the space provided identify the following diminished intervals:



Exercise 6:

What are the three families of intervals:

- a) **Perfect**
- b) **Major and minor**
- c) **Augmented and diminished**

Exercise 7:

Fill in the missing words:

A major interval when inverted gives a **minor** interval (and vice versa), and an **augmented** interval when inverted gives a diminished interval (and vice versa).

Exercise 8:

Identify the following intervals:

Minor second

Major third

Diminished fifth

Diminished seventh

Perfect fifth

Minor seventh

Major sixth

Augmented octave

Exercise 9:

Name the inversions of each of these intervals:

<u>Interval</u>	<u>Inversion</u>
-----------------	------------------

First (unison, prime) **Octave**

Augmented prime **Diminished octave**

Minor second **Major seventh**

Major second **Minor seventh**

Augmented second **Diminished seventh.**

Diminished third **Augmented sixth**

Minor third **Major sixth**

Major third **Minor sixth**

Augmented third **Diminished sixth**

Diminished fourth **Augmented fifth**

Perfect fourth **Perfect fifth**

Augmented fourth **Diminished fifth.**

Chapter Thirteen: Chordal Inversions, Octave Doubling and Spacing - Exercises

Exercise 1:

Complete the following sentence:

A triad has three notes which are called the root, the **third** and the **fifth**.

Exercise 2:

Name the positions (inversions) as determined by the bass notes of the following C major triads:

Exercise 3:

Identify the chords including their respective inversions. In order from the beginning they are

- a) A minor in root position b) C major first inversion c) E major first inversion
 - d) F major second inversion e) G major root position f) A minor second inversion g) C augmented root position

Exercise 4:

In the space provided write out the inversions of the following chords.

Example:

	A	C	E	First Inversion:	C	E	A
a)	C	E	G	Second Inversion:	G	C	E
b)	F	A	C	First Inversion:	A	C	F
c)	E	G#	B	Second Inversion:	B	E	G#
d)	C	E	G#	First Inversion:	E	G#	C
e)	G	C	E	Root Position:	C	E	G
f)	A	D	F	First Inversion:	F	A	D

Exercise 5:

Fill in the missing words:

There are two kinds of chord spacing: closed and **open**. **Closed** spacing is where the notes of a chord are crowded together as closely as possible, whilst **open** spacing is where the chord is given a wider spread over the register.

Exercise 6:

Sequence the following chords in as many different types of spacing as you can think of.

An acoustic piano patch would be suitable for this, or even a string orchestra patch.

Feel free to double notes at the octave in order to give a full and rich sounding sonority.

Having done so listen carefully to each sonority and assess the merits and/or shortfalls of each.

- a) A minor triad – root position
- b) C major triad – first inversion
- c) F major triad – second inversion
- d) D minor triad – root position

Mark according to your own discretion.

Exercise 7:

Fill in the missing harmony parts using the chords indicated:

When marking look for:

- a) Make sure each chord is a complete triad.
- b) To assure smooth voice leading look out for shared notes that can be carried over through successive chords.
- c) Score for at least four separate parts meaning that with each chord one or more of the notes needs doubling.

Chapter Fourteen: Additive Rhythms – Exercises

Exercise 1:

Fill in the correct time signatures for each rhythm:

- a) **7/8**
- b) **11/16**
- c) **9/8**
- d) **15/16**

Exercise 2:

Compose four bar rhythms using the following time signatures.

Mark according to your own discretion. Look for a) Correct tally of note values for time signature b) Logical use of motives in the rhythm.

Exercise 3:

11/8: Any grouping involving 22223 or 3332 in any order.

8/8: Any grouping involving 2222 and 233 in any order.

Exercise 4:

Compose and sequence a lead line using the following time signatures and keys:

- a) 7/8 in the key of C major.
- b) 5/8 in the key of A natural minor.
- c) 13/8 in the key of A harmonic minor.

Mark according to your own discretion.

Exercise 5:

Fill in the missing notes required to complete the following rhythms:

a) 

b) 

c) 

Chapter Fifteen: Expanding Your Knowledge of Keys – Exercises

Exercise 1:

Fill in the missing words:

The scale from which the notes of a key are selected has twelve notes and is known as the **chromatic scale**. Any of these twelve notes can be taken to be the prospective **keynote** (or tonic) of a major or minor scale.

Exercise 2:

To construct a major scale upon any keynote it is necessary to apply the formula:
TTSTTS

Exercise 3:

Fill in the notes required to complete the following scales:

C major:	C	D	E	F	G	A	B	C
D major:	D	E	F#	G	A	B	C#	D
F major:	F	G	A	Bb	C	D	E	F
Bb major:	Bb	C	D	Eb	F	G	A	Bb
G major:	G	A	B	C	D	E	F#	G

Exercise 4:

Identify the major key signatures: C, F, D, Bb, and G in that order from top to bottom.

Exercise 5:

Fill in the missing words:

To work out a relative minor key count down **three** notes down (or up **six** notes) from the tonic of the equivalent major key. The relative minor of the key of G is therefore **E** minor.

Exercise 6:

Write down the relative minor keys of the following major keys:

Major Key	Relative Minor
C major	A minor
F major	D minor
G major	E minor
D major	B minor
Bb major	G minor

Exercise 7:

Fill in the notes required to complete the following triads:

Key of Bb major; Chord ii; first inversion:	Eb	G	C
Key of D natural minor; Chord III; root position:	F	A	C
Key of F major; Chord VI; second inversion:	A	D	F
Key of D major; Chord IV; root position:	G	B	D
Key of G harmonic minor; Chord IV; root position:	C	Eb	G
Key of G major; Chord vi; first inversion:	G	B	E
Key of E natural minor; Chord ii; root position:	F#	A	C

Exercise 8:

Correctly play from memory the following scales. The correct fingering for each scale can be found in the appendix: G major, D major, F major; Bb major.

Mark according to evenness of tone and correctness of technique.

Exercise 9:

Transpose the following major key three chord progression (I, IV, V) into the required keys:

C major:	C E G	F A C	G B D
Bb major:	Bb D F	Eb G Bb	F A C
D major:	D F# A	G B D	A C# E
F major:	F A C	Bb D F	C E G

Exercise 10:

Correctly play from memory the arpeggios of the following scales: G harmonic minor, D melodic minor , E natural minor; B harmonic minor.

Mark according to evenness of tone and correctness of technique.

Exercise 11:

Transpose the following minor key three chord progression (I, IV, V) into the required keys:

A natural minor:	A C E	D F A	E G B
G harmonic minor:	G Bb D	C Eb G	D F# A
D harmonic minor	D F A	G Bb D	A C# E
E natural minor:	E G B	A C E	B D F#
B harmonic minor:	B D F#	E G B	F#A# C#

Exercise 12:

Play correctly from memory the following scales. G and D harmonic minor, E and B melodic minor.

Mark according to evenness of tone and correctness of technique.

Chapter Sixteen: The Pentatonic Scale – Exercises

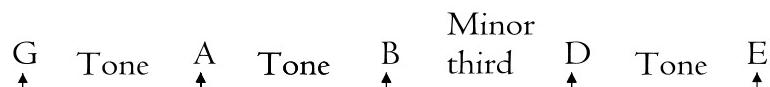
Exercise 1:

Name four different types of music in which the pentatonic scale has been used.

Any four from the list in chapter seventeen for full marks. Use discretion on any alternatives not listed.

Exercise 2:

Label and identify the intervals between each of the notes of this G pentatonic scale:



Exercise 3:

Build a pentatonic scale on the following keynotes:

D	E	F#	A	B
F	G	A	C	D
Bb	C	D	F	G

Exercise 4:

Build all five pentatonic modes on this tonic note C:

- a) C D E G A
- b) C D F G A
- c) C D F G Bb
- d) C Eb F G Bb
- e) C Eb F Ab Bb

Exercise 5:

Identify three added note chords that could be used in the following pentatonic scale:

F G A C D

Any of the following will suffice: F A C D; F A C G; F A C D G; D F A C G

Exercise 6:

Compose a lead using the pentatonic scale. Having done so add a harmony based on quintal chords – chords composed of superimposed fifths.

Mark according to your own discretion.

Chapter Seventeen: Major, Minor, Augmented and Diminished Triads – Exercises

Exercise 1:

a) What kind of triad are the following:

- 1) Example: C E G is a major triad.
2) C Eb G is a minor triad.
3) C Eb Gb is a diminished triad.
4) C E G# is an augmented triad.

b) Which of the above do the following symbols denote:

- | | | |
|----|---------------|----|
| Cm | denotes chord | 2) |
| C+ | denotes chord | 4) |
| Co | denotes chord | 3) |
| C | denotes chord | 1) |

Exercise 2:

The semitone rule. Fill in the number of semitones required for each triad:

Diminished Triad: 3 plus 3 semitones.

Minor Triad: 3 plus 4 semitones.

Major Triad: 4 plus 3 semitones.

Augmented Triad: 4 plus 4 semitones.

Exercise 3:

Identify the triads. Include the inversion.

- a) F major root position b) F augmented first inversion c) G# diminished root position
d) A minor second inversion e) G minor first inversion

Exercise 4:

What kind of triad. a) augmented b) diminished c) minor d) major e) major f) minor

Exercise 5)

Identify:

- a) The key of each scale given below. 1) **F major** 2) **E minor** 3) **G minor**
 - b) The scale used. 1) **major** 2) **melodic minor ascending** 3) **harmonic minor**
 - c) Each of the seven triads.
- 1a) **C major**, b) **D minor**, c) **E diminished**, d) **F major**, e) **G minor**, f) **A minor**, g) **B flat major**.
- 2a) **E minor** b) **F# minor** c) **G augmented** d) **A major** e) **B major** f) **C# diminished** g) **D# diminished**
- 3a) **G minor** b) **A diminished** c) **Bb augmented** d) **C minor** e) **D major** f) **Eb major** g) **F# diminished**.

Chapter Eighteen: Chord Progressions and Root Movement – Exercises

Exercise 1:

Fill in the missing words: A sequence of chords is called a **chord progression**. The most important feature of chord progressions is the sense of **root movement**, of which there are three types, **root movement** by seconds, thirds and fourths.

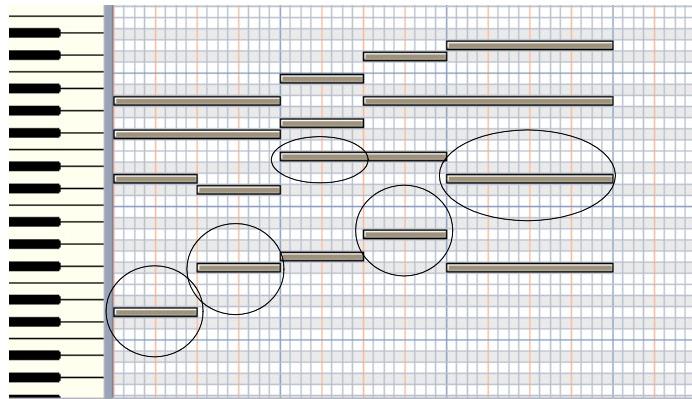
Exercise 2:

a) What key is the chord progression given below in?

The chord progression is in the key of **D major**.

b) Identify each of the chords: **D; F#m; Em/G; A; D/F#**.

c) Circle the roots of each chord.



Exercise 3:

Using your sequencers complete the harmony by adding three parts above the following chordal roots:

Mark at your own discretion. Look for a) Complete triads b) Smooth voice leading.

Exercise 4:

Mark at your own discretion.

Chapter Nineteen: The Cycle of Fifths – Exercises

Exercise 1:

Fill in the missing words:

A major scale whose **tonic** (keynote) is a perfect fifth above the keynote of C requires the addition of a **sharp** in the key signature (the key of G major). This produces the requisite semitone gap between the **seventh** and **eighth** degrees of the scale. Similarly a major scale whose tonic is a **perfect fifth** above G (D major) requires **two sharps** in the key signature.

Exercise 2:

Fill in the missing words:

A major scale whose tonic lies a **perfect fourth** below the keynote of C requires the addition of a **flat** in the key signature (F major). A major scale whose tonic is a further fifth down fifth (Bb) then requires **two flats** in the key signature.

Exercise 3:

- Fill in the notes required to complete each of these major scales.
- Having done so circle the note that is the tonic of the relative minor key in each case.

T	T	S	T	T	T	S	
C	D	E	F	G	A	B	C
G	A	B	C	D	E	F $\#$	G
D	E	F $\#$	G	A	B	C $\#$	D
A	B	C $\#$	D	E	F $\#$	G $\#$	A
E	F $\#$	G $\#$	A	B	C $\#$	D $\#$	E
B	C $\#$	D $\#$	E	F $\#$	G $\#$	A $\#$	B
F $\#$	G $\#$	A $\#$	B	C $\#$	D $\#$	E $\#$	F $\#$

Exercise 4:

Play the following major scales correctly from memory in the following order:

C – G – D – A – E – B – F $\#$

Mark at your own discretion. Look out for a) Evenness of tone b) Smoothness of execution c) The correct technique.

Exercise 5:

- a) Fill in the notes required to complete the following major scales.
b) Circle the key which is enharmonically equivalent to the key of F# major.

T T S T T T S
C D E F G A B C
F G A B_b C D E F
B_b C D E_b F G A B_b
E_b F G A_b B_b C D E_b
A_b B_b C D_b E_b F G A_b
D_b E_b F G_b A_b B_b C D_b
G_b A_b B_b C_b D_b E_b F G_b

Exercise 6:

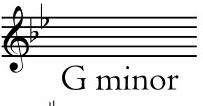
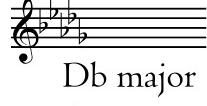
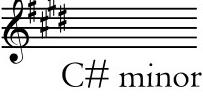
Play the following major scales correctly from memory in the following order:

C – F – Bb – Eb – Ab – Db – Gb

Mark at your own discretion. Look out for a) Evenness of tone b) Smoothness of execution c) The correct technique.

Exercise 7:

Identify the keys which use the following key signatures. Those in the left hand column are all major keys, those in the right all minor keys:

Major	Minor
 G major	 G minor
 Db major	 C# minor
 F# major	 F minor

Exercise 8:

Play the following minor scales correctly from memory in the following order:

A – E – B – F# - C# - G# - D#

Mark at your own discretion. Look out for a) Evenness of tone b) Smoothness of execution c) The correct technique.

Chapter 20: The Seven Diatonic Modes – Exercises

Exercise 1:

Circle the note which is the tonic or first degree of the following modal scales:

Ionian Mode:

C D E F G A B C

Mixolydian Mode:

C D E F **G** A B C

Dorian Mode:

C **D** E F G A B C

Aeolian Mode:

C D E F G **A** B C

Phrygian Mode:

C D **E** F G A B C

Locrian Mode:

C D E F G A **B** C

Lydian Mode:

C D E **F** G A B C

Exercise 2:

Identify the following modes on two levels – first state the keynote and then the mode i.e. F Phrygian, etc.:

The image displays four musical staves, each representing a different mode. The first staff, labeled 'E Phrygian', shows a pattern of notes starting on E: E, D, C, B, A, G, F. The second staff, labeled 'F Dorian', shows a pattern starting on F: F, E, D, C, B, A, G. The third staff, labeled 'F Mixolydian', shows a pattern starting on F: F, E, D, C, B, A, G. The fourth staff, labeled 'C#Aeolian', shows a pattern starting on C# (with a sharp sign above the staff): C#, B, A, G, F, E, D.

Exercise 3:

Using your sequencers complete the chord progressions in the mode and key indicated. Mark at your own discretion.

Exercise 4:

Fill in the notes required to complete each mode in the key indicated.

	1	2	3	4	5	6	7
C Dorian:	C	D	E b	F	G	A	B b
F # Locrian:	F #	G	A	B	C	D	E
G Aeolian:	G	A	B b	C	D	E b	F
E b Lydian:	E b	F	G	A	B b	C	D

Chapter Twenty-one: Chords of the Seventh – Exercises

Exercise 1:

Name three types of complex chords (chords other than triads). Answers from any of the following: seventh chords, ninth chords, eleventh chords, thirteenth chords, added note chords.

Exercise 2:

Fill in the missing words:

A chord of the seventh is obtained when to the root, third and fifth of a **triad** a **seventh above the root of the chord is added.**

Exercise 3:

Sequence a closed position Cmaj7 chord for strings. Then produce as many different types of spacing of the same chord as you can. Listen carefully to each sonority in order to assess its strengths and merits.

Mark at your own discretion.

Exercise 4:

Fill in the other three notes required to complete each of the indicated seventh chords:

A musical staff in G clef with four measures. Each measure contains a bass note (C) and an open eighth-note chord (G, B, D). The first measure has the top note (G) on the middle line. The second measure has the top note (G) on the bottom line. The third measure has the top note (G) on the middle line. The fourth measure has the top note (G) on the bottom line.

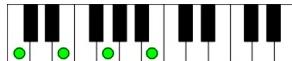
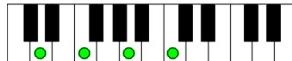
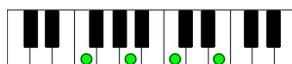
Fmaj7 Fmaj7/A Fmaj7/C Fmaj7/E

A musical staff in G clef with four measures. Each measure contains a bass note (D) and an open eighth-note chord (D, F, A). The first measure has the top note (F) on the middle line. The second measure has the top note (F) on the bottom line. The third measure has the top note (F) on the middle line. The fourth measure has the top note (F) on the bottom line.

Dm7 Dm7/F Dm7/A Dm7/C

Exercise 5:

Identify and label the following seventh chords in the key of C major in the manner indicated. The first seventh chord has already been identified and labeled for you.

 I₇ Cmaj7 ii₇ Dm7 iii₇ Em7 IV₇ Fmaj7 V₇ G7 vi₇ Am7 vii₇ Bø7

Exercise 6:

Mark at your own discretion.

Exercise 7:

List and identify the seventh chords belonging to the following keys:

1) D natural minor:	D	E	F	G	A	Bb	C	D
Chord I:	D	F	A	C	Dm7			
Chord II:	E	G	Bb	D	Eo7			
Chord III:	F	A	C	E	Fmaj7			
Chord IV:	G	Bb	D	F	Gm7			
Chord V:	A	C	E	G	Am7			
Chord VI:	Bb	D	F	A	Bbmaj7			
Chord VII:	C	E	G	Bb	C7			

2) B harmonic minor: B C# D E F# G A# B

Chord I:	B	D	F#	A#	Bm/maj7
Chord II:	C#	E	G	B	C#o7
Chord III:	D	F#	A#	C#	D+maj7
Chord IV:	E	G	B	D	Em7
Chord V:	F#	A#	C#	E	F#7
Chord VI:	G	B	D	F#	Gmaj7
Chord VII:	A#	C#	E	G	A#o/-7

3) F# major: F# G# A# B C# D# E# F#

Chord I:	F#	A#	C#	E#	F#maj7
Chord II:	G#	B	D#	F#	G#m7
Chord III:	A#	C#	E#	G#	A#m7
Chord IV:	B	D#	F#	A#	Bmaj7
Chord V:	C#	E#	G#	B	C#7
Chord VI:	D#	F#	A#	C#	D#m7
Chord VII:	E#	G#	B	D#	E#o7

Chapter Twenty-two: Exotic Scales – Exercises

Exercise 1:

Exotic scales work well in many types of electronic music. They are especially good for creating unusual, exotic atmospheres. To use an exotic scale effectively important information needs to be collected beforehand. This exercise will show you how to do that. Simply answer the following questions:

Name: Syrian Keynote: B Type: Exotic Hexatonic

Pitches: B C D# E G A# B

Question 1: What are the intervals formed by each note of the scale with the keynote (tonic)?

- a) Unison
- b) **Minor second**
- c) **Major third**
- d) **Perfect fourth**
- e) **Minor sixth**
- f) **Major seventh**
- g) Octave

Question 2: What are the salient harmonies of the scale? Mark at your own discretion.

Question 3: What are the salient melodic features that define the scale? Mark at your own discretion.

Exercise 2:

Complete the whole tone scale using the keynote given below. Underneath list the augmented triads which come from it:

Note: Ab Bb C D E F#

Triad 1: Ab C E

Triad 2: Bb D F#

Exercise 3:

List two modes that you feel would be useful to create a traditional Japanese atmosphere. List the reasons for your choice.

Mark at your own discretion.

Exercise 4:

Devise artificial scales using the following criteria:

- 1) A pentatonic scale that uses two minor chords:
- 2) A hexatonic scale that has no whole tones:
- 3) An octatonic scale that uses four major triads.

Mark at your own discretion.

Chapter Twenty-three: Complex Harmony – Exercises

Exercise 1:

Ninth chords work well in many styles of modern electronic music. To use ninth chords you must be able to build them on any degree of the scale that you are using. The purpose of this exercise is to help you to be able to do that.

List all of the ninth chords that can be built using these scales:

C natural minor: C D Eb F G Ab Bb C

I:	C	Eb	G	Bb	D
II:	D	F	Ab	C	Eb
III:	Eb	G	Bb	D	F
IV:	F	Ab	C	Eb	G
V:	G	Bb	D	F	Ab
VI:	Ab	C	Eb	G	Bb
VII:	Bb	D	F	Ab	C

Exercise 2:

List the five possible positions of the following ninth chords:

Cmaj9: C E G B D

Root position:	C	E	G	B	D
First inversion:	E	G	B	D	C
Second inversion:	G	B	D	C	E
Third inversion:	B	D	C	E	G
Fourth inversion:	D	C	E	G	B

Fm9: F Ab C Eb G

Root position: **F** **Ab** **C** **Eb** **G**

First inversion: **Ab** **C** **Eb** **G** **F**

Second inversion: **C** **Eb** **G** **F** **Ab**

Third inversion: **Eb** **G** **F** **Ab** **C**

Fourth inversion: **G** **F** **Ab** **C** **Eb**

Exercise 3:

List the dominant ninth chords of the following keys:

G minor: **D F#A C Eb**

D major: **A C# E G B**

Bb minor: **F A C Eb Gb**

E major: **B D# F# A C#**

Exercise 4:

List all of the eleventh chords that can be built in the key of F major:

- 1) **F A C E G Bb**
- 2) **G Bb D F A C**
- 3) **A C E G Bb D**
- 4) **Bb D F A C E**
- 5) **C E G Bb D F**
- 6) **D F A C E G**
- 7) **E G Bb D F A**

Exercise 5:

State four chromatically altered variations of the following dominant eleventh chord:

G B D F A C

Mark at your own discretion. The root should not be altered, the third should not be flattened, and the seventh should not be sharpened. Anything else goes.

Exercise 6:

List all of the thirteenth chords that can be built in the key of Bb natural minor:

- 1) **Bb Db F Ab C Eb Gb**
- 2) **C Eb Gb Bb Db F Ab**
- 3) **Db F Ab C Eb Gb Bb**
- 4) **Eb Gb Bb Db F Ab C**
- 5) **F Ab C Eb Gb Bb Db**
- 6) **Gb Bb Db F Ab C Eb**
- 7) **Ab C Eb Gb Bb Db F**

Chapter Twenty-four: Arpeggiation – Exercises

To complete these exercises you will need to have use of an arpeggiator or alternatively, use of a pencil tool with which to compose and draw the notes of an arpeggio pattern i.e. onto say piano roll view of your sequencer.

Exercise 1:

Develop and sequence an eight-step arpeggio pattern using a resolution of 1/16th note that traces the given two bar chord progression. Mark at your own discretion.

Exercise 2:

Compose and sequence a sixteen step arpeggio pattern that traces the chord of A minor. Introduce at least two passing notes into the pattern. Mark at your own discretion.

Exercise 3:

List three kinds of non-harmonic tones. Correct for a choice of any of the following: **passing note, melodic auxillary, appoggiatura; returning tone.**

Exercise 4:

Compose and sequence a thirty-two step arpeggio pattern that moves through three octaves and employs two kinds of non-harmonic tones. Build the arpeggio pattern around a Cmaj7 chord.

Mark at your own discretion.

Exercise 5:

Compose and sequence a five step arpeggio pattern that uses an exotic scale of your choice. Mark at your own discretion.

Exercise 6:

Compose and sequence a seven step arpeggio pattern that emulates the acid house bass lines popular in the late eighties and early nineties. Build it around note E, making occasional incursions to other notes of your choice. Mark at your own discretion.

Chapter Twenty-five: Intonation - Exercises

Exercise 1:

Fill in the missing words:

Intonation concerns the fine points of how a scale is **tuned**. The twelve-tone chromatic scale used in Western music is tuned according to the system of **equal temperament**. In this system the octave is divided up into twelve mathematically equal **semitones**.

Exercise 2:

Name three kinds of intonation: Equal temperament; just intonation; Pythagorean intonation.

Exercise 3:

Fill in the missing words:

For the purposes of fine tuning the octave is divided up into **twelve** hundred cents in which each equal semitone is worth **100** cents. By providing a 'fine tune' option on a synthesizer or sampler it is possible to adjust each semitone up or down in increments of a single **cent**.

Exercise 4:

Name three kinds of music in which alternative tunings might be useful. Mark at your own discretion.

Exercise 5:

Fill in the missing words:

Just intonation uses pure intervals as defined by their mathematical ratios in the **harmonic** series: i.e. perfect fifths of ratio 3/2, major thirds of ratio **5/4**, major sixths of ratio 5/3, etc.